

10/24/89

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RECORD NO.

105501
SHAUGHNESSEY NO.

REVIEW NO.

EEB REVIEW

DATE: IN 05-03-89 OUT

FILE OR REG. NO. 1471-101

PETITION OR EXP. NO. _____

DATE OF SUBMISSION 04-14-89

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TYPE PRODUCT(S) Herbicide

DATA ACCESSION NOS. 410669-01,02

PRODUCT MANAGER NO. R. Taylor (25)

PRODUCT NAME(S) tebuthiuron

COMPANY NAME Elanco Products Co.

SUBMISSION PURPOSE Submission of phytotoxicity

data in response to R.S.

SHAUGHNESSEY NO.

CHEMICAL AND FORMULATION

8 AI



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

Subject: EEB Review of Tier I Seed Germination and Tier II
Seedling Emergence/Vegetative Vigor Studies For
Tebuthiuron on Non-target Plants

From: *for* James W. Akerman, Branch Chief *Ray W. Matheny* 10/24/89
Ecological Effects Branch
Environmental Fate and Effects Branch (H7507C)

To: Robert Taylor, PM-25
Fungicide/Herbicide Branch
Registration Division (H7505C)

The Ecological Effects Branch has reviewed the two non-target plant studies submitted by Elanco Products Co. in response to the tebuthiuron registration standard. Both studies satisfy the part 158.150 guideline requirements for Tier I seed germination (122-1) and Tier II seed germination/seedling emergence and vegetative vigor (soil applied, 123-1).

The Tier I study demonstrated that tebuthiuron did not significantly inhibit germination of the 10 crop plants tested from use of the maximum 6# ai per acre label rate. In the Tier II study for seedling emergence and vegetative vigor, crops extremely sensitive to tebuthiuron were cabbage, radish, cucumber and wheat, however, each crop tested exhibited adverse effects at low enough levels to trigger a Tier III terrestrial field study.

In the Registration Standard document for tebuthiuron, the Tier I Selenastrum capricornutum (freshwater green algae) study triggered additional Tier II studies. If Tier II aquatic studies trigger a Tier III aquatic study, the Registrant may want to consider a combined terrestrial/aquatic Tier III field study.

The registrant should submit Tier III protocols for EEB review before commencing the study.

Outstanding Studies Include:

- 1.) Effects data from foliar application of tebuthiuron to plants. Elanco Products Inc. stated on 7-27-89 that these data would be submitted so that Tier II foliar tests for vegetative vigor could be waived.

2.) Tier II, 123-2 Aquatic Plant Growth Studies on:

Lemna gibba- duckweed



Skeketonema costantum- marine diatom

Anabaena fos-aquae- blue-green alga

(unspecified species)- freshwater diatom

Selenastrum capricornutum- freshwater green alga (adverse
effects noted in Tier I tests)

DATA EVALUATION RECORD

- 1.) CHEMICAL: tebuthiuron= N-[5-(1-1-dimethylethyl)-1,3,4-thiadiazol-2-yl]N,N"-dimethylurea
1471-101 (Technical)
1471-103 (Spike 5G-2#ai/40#bucket)
1471-115 (Graslan 10P-5#ai/50#bag)
1471-119 (Graslan 40P-20#ai/50#bag)
1471-123 (Spike 20P-4#ai/20#bag)
1471-124 (Spike 40P-8#ai/20#bag)
1471-147 (Spike DF-21.25#ai/25#bag)
- 2.) TEST MATERIAL: tebuthiuron technical - 99.6%
- 3.) STUDY TYPE: Nontarget Area Phytotoxicity: Tier II (123-1 seed germination/seedling emergence), (123-1 vegetative vigor)
- 4.) CITATION: Influence Of Tebuthiuron On Seedling Emergence And Vegetative Vigor Of Ten Crop Plants. Prepared by Lilly Research Laboratories, Eli Lilly Co.; 10-27-88 (unpublished study, received by EPA on 04-18-89).
MRID NO.: 410669-01
- 5.) REVIEWED BY:
Richard C. Petrie
Agronomist
EEB/EFED
Signature: 
Date: 10/23/89
- 6.) APPROVED BY:
Douglas J. Urban
Head, Section 3
EEB/EFED
Signature: 
Date: 10/23/89
- 7.) CONCLUSIONS:
This study is core for Tier 2, (123-1, seed germination and seedling emergence). Based on a 5% runoff scenario, tebuthiuron is expected to adversely affect a broad spectrum of nontarget broadleaf and grassy plant species at current label rates. Due to adverse effects observed, Tier III data are required.

No Tier II Aquatic Studies (122-2) were submitted. We expect that these are in progress.

Tebuthiuron is aerially applied, however, only pelleted formulations are applied aerially. The pellets are not expected to drift very far off-target, therefore, drift studies (201-1, 201-2) are not required.

8.) RECOMMENDATIONS:

A Tier III terrestrial field study is required (124-1). Tier II Aquatic Plant Growth tests were requested by EEB in 1988.

9.) BACKGROUND:

This study was submitted in response to the tebuthiuron registration standard.

10.) DISCUSSION OF INDIVIDUAL TESTS: N/A

11.) MATERIALS AND METHODS:

Technical tebuthiuron (T389MG8) was applied at two different dosage ranges, one for broadleaf crops and one for grass crops. The application rate range for soybean, radish, cotton, cucumber, cabbage, and sunflower was 0.02, 0.04, 0.08, 0.16, 0.32, and 0.64 lb. a.i. per acre. A rate range of 0.04, 0.08, 0.16, 0.32, 0.64, and 1.28 lb. a.i. per acre was used for the grass crops corn, wheat, sorghum, and rice. All crops had untreated controls.

Tebuthiuron was dissolved at the rate of 28.8 mg or 57.6 mg in 7.5 ml of an acetone and ethanol (1:1 ratio) solution, and then added to 67.5 ml of deionized water to total 75.0 ml of stock solution. Twelve and one-half ml of solution were sprayed per container, three replicates per rate. For the untreated controls, 7.5 ml of the acetone and ethanol (1:1 ratio) solution was added to 68.5 ml deionized water and 12.5 ml solution was sprayed on each untreated control.

The tebuthiuron solution was sprayed uniformly over the soil surface (preemergence) of each container. The 12.5 ml rate simulated a 200 gallon per acre spray solution.

Seed emergence counts were taken 7, 14, and 21 days after treatment. Vegetative vigor ratings were taken and the type of injury described (burning, chlorosis, stunting, death). After 3 weeks (at test termination), average plant height (in cm) and above ground fresh weights (in grams) were taken.

12.) REPORTED RESULTS:

Regression analyses were conducted to determine EC25 and EC50 values for the emergence, height, and weight of each of the 10 crops.

Tebuthiuron did not interfere with seed emergence of any of the crop plants tested. One week after emergence radish was determined extremely sensitive to tebuthiuron at 0.08 lb a.i. per acre. After 3 weeks, radish, cucumber, cabbage, and wheat were severely injured. At the high rate tested seedlings of these crops were killed. Corn, rice, cotton, and sunflower were intermediate in susceptibility and were injured 50% or more at the high rate tested. A no-effect level of 0.02 lb. a.i. per acre was determined for broadleaf crops and of 0.04 lb. a.i. per acre for the grass crops 3 weeks after treatment. Early injury symptoms were chlorosis and stunting of plants followed by burning of leaves and eventual plant death of some species at the high rate.

All crops were reduced in height as the tebuthiuron rate was increased. Cucumber, radish, cabbage, and wheat were reduced the most in height.

EC25 Results Reported (#ai/A)*

<u>CPOP</u>	<u>EMERGENCE</u>	<u>HEIGHT</u>	<u>WEIGHT</u>
caggage	0.43	0.10	0.11
cucumber	0.22	0.16	0.12
radish	0.20	0.06	0.05
rice	>1.28	0.91	0.84
sorghum	>1.28	0.97	1.05
sunflower	>0.64	0.37	0.38
wheat	0.03	0.04	0.04

The dose responses for corn, cotton and soybean were not well defined. The maximum dose was used for the EC25 value.

corn	>1.28	0.75	1.08
cotton	>0.64	0.34	0.34
soybean	>0.64	>0.64	>0.64

* Regression Analyses. Anderson and Nelson, Biometrics.
Vol.31 (2), pp.303-318.

EC50 Results Reported (#ai/A) *

<u>CROP</u>	<u>EMERGENCE</u>	<u>HEIGHT</u>	<u>WEIGHT</u>
cabbage	0.16	0.23	0.14
cucumber	0.33	0.32	0.27
radish	0.33	0.11	0.09
rice	>1.28	>1.28	1.23
sorghum	>1.28	>1.28	>1.28
sunflower	>0.64	0.62	0.63
wheat	0.16	0.09	0.08

The dose responses for corn, cotton, and soybeans were not well defined. The maximum dose was used for the EC50 value.

corn	>1.28	1.27	1.28
cotton	>0.64	>0.64	>0.64
soybean	>0.64	>0.64	>0.64

* Regression analyses. Anderson and Nelson. Biometrics, Vol.31 (2), pp. 303-318.

13.) STUDY AUTHOR'S CONCLUSIONS/QUALITY ASSURANCE MEASURES:

Tebuthiuron did not interfere with the emergence of the 10 crop plants tested when compared with controls. This effect was expected because tebuthiuron is primarily taken up by plant parts as they come in contact with the surface layer of soil treated with tebuthiuron. The no-effect level for broadleaf crops tested was 0.02 #ai/A and was 0.04 #ai/A for grass crops.

Vegetative vigor, plant heights, and plant weights were reduced for all crops tested as the rate was increased. Visual injury symptoms observed early in the test period were chlorosis and stunting followed by burning of leaves. Eventually some plants died at the higher rates tested.

The following good laboratory practices statement was submitted: Data and information in this report are not subject to Good Laboratory Practices Regulations.

14.) REVIEWER'S DISCUSSION AND INTERPRETATION OF STUDY RESULTS:

A. TEST PROCEDURES: The study followed the protocol outlined in the 1982 guidelines, Subdivision J. The three required test plants corn, soybean, and (a root crop) radish were used. In

addition, cabbage, cotton, cucumber, sunflower, wheat, sorghum, and rice were tested.

Rate ranges selected, seed preparation and germination procedures, application method, number of replicates, test duration, and greenhouse growing conditions were acceptable.

B. STASTICAL ANALYSIS: Using the Stephans Program, EC25 and EC50 values were calculated from seedling emergence, plant height, fresh weight, and vegetative vigor ratings.

<u>CROP</u>	<u>EMERGENCE (#ai)</u>		<u>AVE. PLANT HT. (#ai)</u>	
	<u>EC25</u>	<u>EC50</u>	<u>EC25</u>	<u>EC50</u>
radish	0.13	0.23	0.06	0.14
cabbage	0.03	0.07	0.05	0.10
cotton	----	>0.64	0.27	0.91
cucumber	0.13	0.24	0.08	0.20
sunflower	----	>0.64	0.30	1.03
soybean	----	>0.64	0.74	1.70
wheat	0.10	0.16	0.09	0.15
corn	----	>1.28	0.39	1.30
sorghum	----	>1.28	0.89	1.84
rice	----	>1.28	0.83	1.85

<u>CROP</u>	<u>AVE. FRESH WT. (#ai)</u>		<u>VEGET. VIGOR (#ai)</u>	
	<u>EC25</u>	<u>EC50</u>	<u>EC25</u>	<u>EC50</u>
radish	0.05	0.09	0.09	0.15
cabbage	0.03	0.06	0.07	0.10
cotton	0.43	4.82	0.31	0.58
cucumber	0.06	0.13	0.11	0.18
sunflower	0.36	1.19	0.25	0.57
soybean	----	>0.64	0.31	0.90
wheat	0.07	0.11	0.09	0.12
corn	1.02	1.85	0.65	1.39
sorghum	1.12	1.42	1.00	1.43
rice	0.74	1.26	0.53	1.22

C. Discussion/Results: The current maximum label rate for tebuthiuron is 6 lb. ai/A. Based on Registration Division label information, the maximum label rate was reduced from 16 lb. ai/A to 6 lb. ai/A in 1987. In this study, the maximum rate tested for broadleaf crops was 0.64 lb. ai and 1.28 lb. ai for grass crops. The water solubility of tebuthiuron, as reported in the 1989 Herbicide Handbook of the Weed Science Society of America, is 2,500 mg/liter (2,500 ppm). Because of the high solubility in water a 5% runoff scenario was used in the following EEC calculations:

10 ACRE AQUATIC

6# ai/A x 10 acres x 5% = 3.0 # ai runoff

(6 inch deep pond= 2,202 ppb)

(6 foot deep pond= 183 ppb)

1 ACRE TERRESTRIAL

6# ai/A x 5% = 0.3 # ai runoff

(top 0.5 inch soil= 600 ppb)

The EC25 and EC50 values for radish, cabbage, cucumber, and wheat were below 0.3# ai. and would be severely affected by the calculated levels of runoff. EC50 values for corn, sorghum, and rice were approximately 1.85# ai and ranged from approximately 1.0 to 4.8# ai for cotton. Adverse effects are expected to these species as well. Based on this study, it is expected that tebuthiuron at current use rates may be potentially phytotoxic to a broad range of nontarget plant species.

The effects noted in this study triggers the need for additional testing at the Tier III level. Because of detrimental effects on Selenastrum capricornutum, Tier II Aquatic Plant studies were requested in the Registration Standard document for tebuthiuron in 1987. These studies are still outstanding.

Aerial application of tebuthiuron is allowed on the Spike 20P, Graslan 40P, and Graslan 10P labels. These formulations are bullet-sized pellets used on rangeland, rights of ways, industrial sites, pastureland, pipelines, fencerows, firebreaks, and ditchbanks. Because of the weight of these pellets no significant off-target movement is likely to occur from aerial applications. Therefore, drift studies (201-1,202-2) are not required at this time.

D. Adequacy Of The Study:

(1) Classification: Tier II - Core, Tier III triggered.

(2) Rationale: N/A

(3) Repairability: N/A

15. Completion of one-liner: One liner completed.

16. CBI Appendix: N/A

DATA EVALUATION RECORD

- 1.) CHEMICAL: tebuthiuron= N-[5-(1-1-dimethylethyl)-1,3,4-thiadiazol-2-yl]N,N"-dimethylurea
1471-101 (Technical)
1471-103 (Spike 5G-2#ai/40#bucket)
1471-115 (Graslan 10P-5#ai/50#bag)
1471-119 (Graslan 40P-20#ai/50#bag)
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1471-124 (Spike 40P-8#ai/20#bag)
1471-147 (Spike DF-21.25#ai/25#bag)
- 2.) TEST MATERIAL: tebuthiuron technical - 99.6%
- 3.) STUDY TYPE: Nontarget Area Phytotoxicity: Seed Germination Study, Tier II (122-1).
- 4.) CITATION: Influence Of Tebuthiuron On The Germination Of Seeds Of Ten Crop Plants. Prepared by Lilly Research Laboratories, Eli Lilly Co.; 10-10-88 (unpublished study, received by EPA on 04-18-89).
MRID NO.: 410669-02
- 5.) REVIEWED BY:
Richard C. Petrie
Agronomist
EEB/EFED
Signature: *Richard C. Petrie*
Date: 10/23/89
- 6.) APPROVED BY:
Douglas J. Urban
Head, Section 3
EEB/EFED
Signature: *Douglas J. Urban*
Date: 10/23/89
- 7.) CONCLUSIONS:
This study is core for Tier I, (122-1, seed germination). The maximum registered rate of tebuthiuron (6# ai/A) did not appear to adversely affect germination of the 10 crop plants tested: corn, sorghum, wheat, rice, soybean, cotton, cucumber, sunflower, radish, and cabbage. Cotton germination was 2.8% less than the controls and cabbage germination was 3.8% less than the controls (less than 1 seed per replicate).

8.) RECOMMENDATIONS: N/A

9.) BACKGROUND:

This study was submitted in response to the tebuthiuron registration standard.

10.) DISCUSSION OF INDIVIDUAL TESTS: N/A

11.) MATERIALS AND METHODS:

Technical tebuthiuron (T389MG8) was applied to blotter paper at a concentration comparable to the maximum tebuthiuron label rate of 6# ai/A. Treated blotter paper with seedlings were placed in a seed germinator and maintained in darkness at 25 degrees centigrade for 5 days. After 5 days all germinated seedlings were rated as normal or abnormal.

12.) REPORTED RESULTS:

Recorded data were transformed* to stabilize variance and increase the power of the test.

MEAN PROPORTION OF NON-GERMINATED SEEDLINGS
WITH AND WITHOUT TEBUTHIURON
N=3 (cornN=2)

<u>CROP</u>	<u>0ppm</u>	<u>18ppm</u>
cabbage	0.24	0.27
corn	0.00	0.00
cotton	0.00	0.03
cucumber	0.01	0.01
radish	0.03	0.00
rice	0.39	0.24
sorghum	0.09	0.05
soybean	0.05	0.12
sunflower	0.12	0.07
wheat	0.05	0.01

* Freeman, Tukey. Transformations Related to the Angular and the Square Root. Annals of Mathematical Statistics. 1950. pp607-611.

13.) STUDY AUTHOR'S CONCLUSIONS/QUALITY ASSURANCE MEASURES:

The authors concluded that no detrimental differences ($P>0.05$) were produced by tebuthiuron on the seedling emergence of crop plants.

This study was not subject to Good Laboratory Practice standards and thus was not monitored by the QA unit. The study was, however, conducted within the principles of good laboratory practice.

14.) REVIEWER'S DISCUSSION AND INTERPRETATION OF STUDY RESULTS:

A. TEST PROCEDURES: The study followed the protocol outlined in the 1982 guidelines, Subdivision J. The three required test plants corn, soybean, and (a root crop) radish were used. In addition, cabbage, cotton, cucumber, sunflower, wheat, sorghum, and rice were tested.

Rate ranges selected, seed preparation and germination procedures, application method, number of replicates, test duration, and greenhouse growing conditions were acceptable.

B. STASTICAL ANALYSIS: The percentages of seedlings that germinated in the tebuthiuron treated vs control tests were as follows:

<u>CROP</u>	<u>GERMINATED (18ppm)</u>	<u>GERMINATED (control)</u>
corn	100%	100%
sorghum	95%	90%
wheat	99%	94%
rice	76%	61%
soybean	88%	88%
cotton	97%	100%
cucumber	99%	99%
sunflower	96%	93%
radish	100%	97%
cabbage	73%	76%

Analysis of this data was by observation. No significant differences were noted between treated and control tests because the primary mode of action of tebuthiuron is by contact of the epicotyl with treated soil, not by inhibition of seed germination.

C. Discussion/Results: The current maximum label rate for tebuthiuron is 6 lb. ai/A. Based on Registration Division label information, the maximum label rate was reduced from 16 lb. ai/A to 6 lb. ai/A in 1987. In this study, the maximum rate tested was the required 6 lb. ai/A rate. The maximum label rate of tebuthiuron did not adversely affect germination of the 10 crop species tested. The number of observed abnormal seedlings in treated tests was not significantly different from controls.

Ratings of seed germination were described as germinated vs non-germinated, and normal vs abnormal seedlings of those that germinated. The method used to determine normal vs abnormal was not described but is assumed by the reviewer to be a visual rating as opposed to a height or weight measurement. The study did state that the same types of abnormalities were observed in treated and control tests.

D. Adequacy Of The Study:

(1) Classification: Tier I - Core.

(2) Rationale: N/A

(3) Repairability: N/A

15. Completion of one-liner: N/A

16. CBI Appendix: N/A

To Do

Average Fresh Wt - (GM^s)

% of Control

For File
10/23/89

<u>Rate</u>	<u>Radish</u>	<u>Cotton</u>	<u>Cucumber</u>	<u>Sunflower</u>	<u>Soybean</u>	<u>Cabbage</u>
0	100	100	100	100	100	100
0.02	91 9	97 3	85 15	88 98 2	72 28	65 35
0.04	76 24	88 12	79 21	89 11	99 1	93 7
0.08	63 37	100 0	92 8	98 2	98 2	33 67
0.16	24 76	85 15	54 46	99 1	100 0	30 70
0.32	8 92	98 2	17 83	87 13	91 9	0 100
0.64	2 98	48 52	0 100	47 53	91 9	0 100

<u>Rate</u>	<u>Wheat</u>	<u>Corn</u>	<u>Sorghum</u>	<u>Rice</u>
0	100	100	100	100
0.04	100 0	100 0	100 0	100 0
0.08	65 35	100 0	100 0	100 0
0.16	15 85	100 0	100 0	100 0
0.32	9 91	100 0	100 0	100 0
0.64	0 100	80 20	99 1	69 31
1.28	0 100	71 29	62 38	56 44

~~To Do~~
DATE

Emergency
3WK Festing

Cabbage	Radish	↓	Cotton	Cucumber	Sunflower	Soybean
Rate (#ai/A)	↓	↓	↓			
100	0	100%	100	100	100	100
65 35	0.02	99 1	0 100	96 4	100 0	94 6
100 0	0.04	97 3	16 84	96 4	100 0	100 0
44 66	0.08	97 3	5 95	96 4	100 0	100 0
44 66	0.16	63 ³⁷	(23) 77	75 25	100 0	100 0
5 95	0.32	32 ⁴⁸	(10) 103	48 52	100 0	100 0
0 100	0.64	10 ⁹⁰	(23) 77	0 100	83 17	100 0
<hr/>						
	Date	Rate	Wheat	corn	Sorghum	Rice
	0	-	100	100	100	100
	0.04	-	100 0	93 7	97 3	100 0
	0.08	-	90 10	100 0	94 6	100 0
	0.16	-	38 62	93 7	84 16	100 0
	0.32	-	18 82	100 0	93 7	92 8
	0.64	-	3 97	87 13	87 13	92
	1.28	-	0 100	97 3	81 19	90 11

Average Plant Height ~~cm~~ % of Control

DONE

<u>Rate</u>	<u>Radish</u>	<u>Cotton</u>	<u>Cucumber</u>	<u>Sunflower</u>	<u>Soybean</u>	<u>Cabbage</u>
0 -	100	100	100	100	100	100
0.02 -	92 ⁸	97 ³	89 ¹¹	96 ⁴	100	81 ¹⁹
0.04 -	82 ¹⁸	94 ⁴	77 ²³	93 ⁷	99 ¹	89 ¹¹
0.08 -	69 ³¹	97 ³	89 ¹¹	95 ⁵	100	62 ³⁸
0.16 -	45 ⁵⁴	79 ²¹	71 ²⁹	92 ⁸	100	56 ⁴⁴
0.32 -	27 ⁷³	79 ²¹	50 ⁵⁰	83 ¹⁷	88 ¹²	6 ⁹⁴
0.64 -	10 ⁹⁰	52 ⁴⁸	0 ¹⁰⁰	47 ⁵³	79 ²¹	0 ¹⁰⁰

<u>Rate</u>	<u>Wheat</u>	<u>Corn</u>	<u>Sorghum</u>	<u>Rice</u>
0 -	100	100	100	100
0.04 -	93 ⁷	100 ⁰	100 ⁰	100 ⁰
0.08 -	84 ¹⁶	100 ⁰	100 ⁰	100 ⁰
0.16 -	36 ⁶⁴	95 ⁶	100 ⁰	100 ⁰
0.32 -	19 ⁸¹	88 ¹²	94 ⁶	90 ¹⁰
0.64 -	7 ⁹³	72 ²⁸	77 ²³	75 ²⁵
1.28 -	0 ¹⁰⁰	52 ⁴⁸	68 ³²	68 ³²

90 Vigorous

Vegetative Vigor

3 Wk. Retention

To day

Rate	Radish	Cotton	Cucumber	Sunflower	Soybean	Cabbage
0	100	100	100	100	100	100
0.02	100 0	100 0	97 3	100 0	100 0	100
0.04	90 10	100 0	97 3	97 3	97 3	100
0.08	80 20	100 0	87 13	93 7	93 7	45 6
0.16	50 50	87 13	67 33	87 13	87 13	30 7
0.32	15 35	75 25	20 80	78 22	73 27	21
0.64	3 97	47 53	0 100	38 62	60 40	0 10

	Wheat	Corn	Sorghum	Rice
0	100	100	100	100
0.04	100 0	100 0	100 0	100 0
0.08	80 20	100 0	100 0	100 0
0.16	20 40	93 7	100 0	90 10
0.32	7 93	93 7	97 3	87 13
0.64	2 98	78 22	100 0	73 27
0.28	0 100	50 50	53 47	47 53

↑

6th/A Max Rate = 18 ppm (w/w)

	% germination of Treated seeds	% germination of Control	<u>No. of seeds that did not germinate</u> <u>% difference</u>
Corn -	100%	100%	0
Soybean -	95%	91%	0
Wheat -	99%	95%	0
Rice -	76% 45%	61%	0
Soybean -	88%	88%	0
Cotton -	97%	100%	3 ✓
Cucumber -	99%	99%	0
Sunflower -	100%	93%	0 ✓
Radish -	100%	97%	3 ✓
Cabbage -	73%	76%	0

Emergence

R.Petrie Spike 10-03-89

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
.64	100	90	90	0
.32	100	68	68	0
.16	100	37	37	0
.08	100	3	3	0
.04	100	3	3	0
.02	100	1	1	0

RADISH

BECAUSE THE NUMBER OF ORGANISMS USED WAS SO LARGE, THE 95 PERCENT CONFIDENCE INTERVALS CALCULATED FROM THE BINOMIAL PROBABILITY ARE UNRELIABLE. USE THE INTERVALS CALCULATED BY THE OTHER TESTS.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .2135791

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS
3	1.714531E-02	<u>.229064</u>	.2068197 .2538092

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
4	.1262532	3.141914	1.359308E-02

SINCE THE PROBABILITY IS LESS THAN 0.05, RESULTS CALCULATED USING THE PROBIT METHOD PROBABLY SHOULD NOT BE USED.

SLOPE = 2.842755
95 PERCENT CONFIDENCE LIMITS = 1.832664 AND 3.852847

→ LC50 = .2254825
95 PERCENT CONFIDENCE LIMITS = .1688022 AND .3106136

LC10 = .0806052
95 PERCENT CONFIDENCE LIMITS = 4.359534E-02 AND .1141698

R.Petrie Spike 10-03-89

Enzyme - Bdf's

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
.64	100	100	100	0
.32	100	95	95	0
.16	100	66	66	0
.08	100	66	66	0
.04	100	0	0	0
.02	100	35	35	0

CABBAGE

BECAUSE THE NUMBER OF ORGANISMS USED WAS SO LARGE, THE 95 PERCENT CONFIDENCE INTERVALS CALCULATED FROM THE BINOMIAL PROBABILITY ARE UNRELIABLE. USE THE INTERVALS CALCULATED BY THE OTHER TESTS.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .070628

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS
5	2.432726E-02	9.531771E-02	.08.087135E-02
6.747528E-02			.08

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
5	.9703661	24.11095	0

A PROBABILITY OF 0 MEANS THAT IT IS LESS THAN 0.001.

SINCE THE PROBABILITY IS LESS THAN 0.05, RESULTS CALCULATED USING THE PROBIT METHOD PROBABLY SHOULD NOT BE USED.

SLOPE = 1.95183
95 PERCENT CONFIDENCE LIMITS = 2.913749E-02 AND 3.874523

LC50 = .06_x880365E-02
95 PERCENT CONFIDENCE LIMITS = 7.939944E-09 AND .5839745

LC10 = 1.537943E-02
95 PERCENT CONFIDENCE LIMITS = 5.877472E-39 AND 4.786473E-02

R.Petrie Spike 10-03-89

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
.64	100	23	23	0
.32	100	0	0	0
.16	100	23	23	0
.08	100	5	5	0
.04	100	16	16	0
.02	100	0	0	0

COTTON

THE BINOMIAL TEST SHOWS THAT 0 AND +INFINITY CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .2262742

THE MOVING AVERAGE METHOD CANNOT BE USED WITH THIS DATA SET BECAUSE NO SPAN WHICH PRODUCES MOVING AVERAGE ANGLES THAT BRACKET 45 DEGREES ALSO USES TWO PERCENT DEAD BETWEEN 0 AND 100 PERCENT.

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
5	9.068488	12.52755	0

A PROBABILITY OF 0 MEANS THAT IT IS LESS THAN 0.001.

SINCE THE PROBABILITY IS LESS THAN 0.05, RESULTS CALCULATED USING THE PROBIT METHOD PROBABLY SHOULD NOT BE USED.

SLOPE = .4456133
95 PERCENT CONFIDENCE LIMITS = -.8963034 AND 1.78753

LC50 = 72.04548
95 PERCENT CONFIDENCE LIMITS = .4832638 AND +INFINITY

? R. Lee W. Brown SAS 10/11/89

LC10 = .1017658
95 PERCENT CONFIDENCE LIMITS = 0 AND +INFINITY

R.Petrie Spike 10-03-89

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
.64	100	100	100	0
.32	100	52	52	0
.16	100	25	25	0
.08	100	4	4	0
.04	100	4	4	0
.02	100	4	4	0

CUCUMBER

THE BINOMIAL TEST SHOWS THAT .16 AND .32 CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .3046213

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95. PERCENT CONFIDENCE LIMITS
3	1.116096E-02	.2460122	.2266733

.2675056

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
5	.9324663	22.54062	0

A PROBABILITY OF 0 MEANS THAT IT IS LESS THAN 0.001.

SINCE THE PROBABILITY IS LESS THAN 0.05, RESULTS CALCULATED USING THE PROBIT METHOD PROBABLY SHOULD NOT BE USED.

SLOPE = 2.618763
95 PERCENT CONFIDENCE LIMITS = 8.997298E-02 AND 5.147553

LC50 = .2409587
95 PERCENT CONFIDENCE LIMITS = 4.784001E-02 AND 104.6369

LC10 = 7.888253E-02
95 PERCENT CONFIDENCE LIMITS = 1.22485E-13 AND .1775501

R.Petrie Spike 10-03-89

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
.64	100	17	17	0
.32	100	0	0	0
.16	100	0	0	0
.08	100	0	0	0
.04	100	0	0	0
.02	100	0	0	0

SUNFLOWER

THE BINOMIAL TEST SHOWS THAT 0 AND +INFINITY CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .4525484

WHEN THERE ARE LESS THAN TWO CONCENTRATIONS AT WHICH THE PERCENT DEAD IS BETWEEN 0 AND 100, NEITHER THE MOVING AVERAGE NOR THE PROBIT METHOD CAN GIVE ANY STATISTICALLY SOUND RESULTS.

R.Petrie Spike 10-03-89

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
.64	100	0	0	0
.32	100	0	0	0
.16	100	0	0	0
.08	100	0	0	0
.04	100	0	0	0
.02	100	6	6	0

SOYBEAN

THE BINOMIAL TEST SHOWS THAT 0 AND +INFINITY CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .4525484

WHEN THERE ARE LESS THAN TWO CONCENTRATIONS AT WHICH THE PERCENT DEAD IS BETWEEN 0 AND 100, NEITHER THE MOVING AVERAGE NOR THE PROBIT METHOD CAN GIVE ANY STATISTICALLY SOUND RESULTS.

Fragover - Gussie

R.Petrie Spike 10-03-89

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
1.28	100	100	100	0
.64	100	97	97	0
.32	100	82	82	0
.16	100	62	62	0
.08	100	10	10	0
.04	100	0	0	0

WHEAT

THE BINOMIAL TEST SHOWS THAT .08 AND .16 CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .1385316

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS
5	8.83112E-03	.1701863	.153326 .1879442

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
5	.1134455	2.880722	2.127546E-02

SINCE THE PROBABILITY IS LESS THAN 0.05, RESULTS CALCULATED USING THE PROBIT METHOD PROBABLY SHOULD NOT BE USED.

SLOPE = 3.613145
95 PERCENT CONFIDENCE LIMITS = 2.396177 AND 4.830112

LC50 = .1619674
95 PERCENT CONFIDENCE LIMITS = .1262909 AND .2072892

LC10 = 7.209967E-02
95 PERCENT CONFIDENCE LIMITS = 4.364769E-02 AND 9.661456E-02

R.Petrie Spike 10-03-89

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
1.28	100	3	3	0
.64	100	13	13	0
.32	100	0	0	0
.16	100	7	7	0
.08	100	0	0	0
.04	100	7	7	0

CORN

THE BINOMIAL TEST SHOWS THAT 0 AND +INFINITY CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS 1.090785E-06

THE MOVING AVERAGE METHOD CANNOT BE USED WITH THIS DATA SET BECAUSE NO SPAN WHICH PRODUCES MOVING AVERAGE ANGLES THAT BRACKET 45 DEGREES ALSO USES TWO PERCENT DEAD BETWEEN 0 AND 100 PERCENT.

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
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4	115.6007	6.365742	0
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A PROBABILITY OF 0 MEANS THAT IT IS LESS THAN 0.001.

SINCE THE PROBABILITY IS LESS THAN 0.05, RESULTS CALCULATED USING THE PROBIT METHOD PROBABLY SHOULD NOT BE USED.

SLOPE = .1095946
95 PERCENT CONFIDENCE LIMITS = -1.068742 AND 1.287931

LC50 = 2.437747E+14
95 PERCENT CONFIDENCE LIMITS = 3.727871 AND +INFINITY

LC10 = 629.252
95 PERCENT CONFIDENCE LIMITS = 0 AND +INFINITY

R.Petrie Spike 10-03-89

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
1.28	100	19	19	0
.64	100	13	13	0
.32	100	7	7	0
.16	100	16	16	0
.08	100	6	6	0
.04	100	3	3	0

SORGHUM

BECAUSE THE NUMBER OF ORGANISMS USED WAS SO LARGE, THE 95 PERCENT CONFIDENCE INTERVALS CALCULATED FROM THE BINOMIAL PROBABILITY ARE UNRELIABLE. USE THE INTERVALS CALCULATED BY THE OTHER TESTS.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS 0

THE MOVING AVERAGE METHOD CANNOT BE USED WITH THIS DATA SET BECAUSE NO SPAN WHICH PRODUCES MOVING AVERAGE ANGLES THAT BRACKET 45 DEGREES ALSO USES TWO PERCENT DEAD BETWEEN 0 AND 100 PERCENT.

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
3	1.450957	2.400097	4.772455E-02

SINCE THE PROBABILITY IS LESS THAN 0.05, RESULTS CALCULATED USING THE PROBIT METHOD PROBABLY SHOULD NOT BE USED.

SLOPE = .4993558
95 PERCENT CONFIDENCE LIMITS = -.1021467 AND 1.100858

LC50 = 84.78459
95 PERCENT CONFIDENCE LIMITS = 3.395512 AND +INFINITY

LC10 = .2426834
95 PERCENT CONFIDENCE LIMITS = 0 AND +INFINITY

R.Petrie Spike 10-03-89

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
1.28	100	10	10	0
.64	100	8	8	0
.32	100	8	8	0
.16	100	0	0	0
.08	100	0	0	0
.04	100	0	0	0

RICE

BECAUSE THE NUMBER OF ORGANISMS USED WAS SO LARGE, THE 95 PERCENT CONFIDENCE INTERVALS CALCULATED FROM THE BINOMIAL PROBABILITY ARE UNRELIABLE. USE THE INTERVALS CALCULATED BY THE OTHER TESTS.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS 0

THE MOVING AVERAGE METHOD CANNOT BE USED WITH THIS DATA SET BECAUSE NO SPAN WHICH PRODUCES MOVING AVERAGE ANGLES THAT BRACKET 45 DEGREES ALSO USES TWO PERCENT DEAD BETWEEN 0 AND 100 PERCENT.

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
3	.1880093	1	5.249948E-02

SLOPE = 1.143307
95 PERCENT CONFIDENCE LIMITS = .6475688 AND 1.639046

LC50 = 12.30542
95 PERCENT CONFIDENCE LIMITS = 4.553848 AND 139.9037

LC10 = .9534195
95 PERCENT CONFIDENCE LIMITS = .6420285 AND 1.822344

Vegetative Vigor - Broadleaves
[34K Catfish]

r.petrie spike 10-02-89

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
.64	100	97	97	0
.32	100	85	85	0
.16	100	50	50	0
.08	100	20	20	0
.04	100	10	10	0
.02	100	0	0	0

QADISH

THE BINOMIAL TEST SHOWS THAT .16 AND .16 CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .16

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS
5	1.073704E-02	.1437407	.1289501 .1610626

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
3	1.718573E-02	1	.2074775

SLOPE = 2.802812
 95 PERCENT CONFIDENCE LIMITS = 2.435379 AND 3.170244

LC50 = .1464485
 95 PERCENT CONFIDENCE LIMITS = .130964 AND .1639546

LC10 = 5.159034E-02
 95 PERCENT CONFIDENCE LIMITS = 4.253459E-02 AND 6.040237E-02

r.petrie spike 10-02-89

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
.64	100	53	53	0
.32	100	25	25	0
.16	100	13	13	0
.08	100	0	0	0
.04	100	0	0	0
.02	100	0	0	0

COTTON

THE BINOMIAL TEST SHOWS THAT .32 AND .64 CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .5959188

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS
1	.2293319	.5959188	.5012337 .8345796

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
5	4.374669E-02	1	.3098103

SLOPE = 2.45765
95 PERCENT CONFIDENCE LIMITS = 1.943615 AND 2.971685

LC50 = .5801569
95 PERCENT CONFIDENCE LIMITS = .4904936 AND .723612

LC10 = .1765191
95 PERCENT CONFIDENCE LIMITS = .1407228 AND .2094045

r.petrie spike 10-02-89

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
.64	100	100	100	0
.32	100	80	80	0
.16	100	33	33	0
.08	100	13	13	0
.04	100	3	3	0
.02	100	3	3	0

Cucumber

THE BINOMIAL TEST SHOWS THAT .16 AND .32 CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .2040063

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS
4	1.073705E-02	.1771793	.1611194 .1952719

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
5	.4121188	11.22657	0

A PROBABILITY OF 0 MEANS THAT IT IS LESS THAN 0.001.

SINCE THE PROBABILITY IS LESS THAN 0.05, RESULTS CALCULATED USING THE PROBIT METHOD PROBABLY SHOULD NOT BE USED.

SLOPE = 2.998775
95 PERCENT CONFIDENCE LIMITS = 1.073667 AND 4.923883

LC50 = .1764246
95 PERCENT CONFIDENCE LIMITS = 9.339203E-02 AND .3549004

LC10 = .0665354
95 PERCENT CONFIDENCE LIMITS = .0102877 AND .1167643

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
.64	100	62	62	0
.32	100	22	22	0
.16	100	13	13	0
.08	100	7	7	0
.04	100	3	3	0
.02	100	0	0	0

Sun-Flower

BECAUSE THE NUMBER OF ORGANISMS USED WAS SO LARGE, THE 95 PERCENT CONFIDENCE INTERVALS CALCULATED FROM THE BINOMIAL PROBABILITY ARE UNRELIABLE. USE THE INTERVALS CALCULATED BY THE OTHER TESTS.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .5235002

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS
1	.1115948	.5235002	.466074 .6099148

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
4	.1905093	2.482285	4.163832E-02

SINCE THE PROBABILITY IS LESS THAN 0.05, RESULTS CALCULATED USING THE PROBIT METHOD PROBABLY SHOULD NOT BE USED.

SLOPE = 1.903514
95 PERCENT CONFIDENCE LIMITS = 1.07268 AND 2.734347

LC50 = .565878
95 PERCENT CONFIDENCE LIMITS = .375658 AND 1.238036

LC10 = .1217687
95 PERCENT CONFIDENCE LIMITS = 5.738127E-02 AND .182114

Veg. Vign

r.Petrie Spike plant 10-03-89

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
.64	100	40	40	0
.32	100	27	27	0
.16	100	13	13	0
.08	100	7	7	0
.04	100	3	3	0
.02	100	0	0	0

SOYBEAN

BECAUSE THE NUMBER OF ORGANISMS USED WAS SO LARGE, THE 95 PERCENT CONFIDENCE INTERVALS CALCULATED FROM THE BINOMIAL PROBABILITY ARE UNRELIABLE. USE THE INTERVALS CALCULATED BY THE OTHER TESTS.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS 0

THE MOVING AVERAGE METHOD CANNOT BE USED WITH THIS DATA SET BECAUSE NO SPAN WHICH PRODUCES MOVING AVERAGE ANGLES THAT BRACKET 45 DEGREES ALSO USES TWO PERCENT DEAD BETWEEN 0 AND 100 PERCENT.

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
3	.0522325	1	.8662795

SLOPE = 1.460892
95 PERCENT CONFIDENCE LIMITS = 1.127014 AND 1.794771

LC50 = .9020101
95 PERCENT CONFIDENCE LIMITS = .6541518 AND 1.444638

LC10 = .1218652
95 PERCENT CONFIDENCE LIMITS = 8.964822E-02 AND .1543165

Veg. Vigor

r.Petrie Spike 10-03-89

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
.64	100	100	100	0
.32	100	98	98	0
.16	100	70	70	0
.08	100	55	55	0
.04	100	0	0	0
.02	100	0	0	0

CABBAGE

THE BINOMIAL TEST SHOWS THAT .04 AND .08 CAN BE
USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT
CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL
ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS 7.657335E-02

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
5	8.83112E-03	.1056242	9.567124E-02	.1164698

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
5	.2913221	7.016129	0

A PROBABILITY OF 0 MEANS THAT IT IS LESS THAN 0.001.

SINCE THE PROBABILITY IS LESS THAN 0.05, RESULTS CALCULATED
USING THE PROBIT METHOD PROBABLY SHOULD NOT BE USED.

SLOPE = 3.924684
95 PERCENT CONFIDENCE LIMITS = 1.806365 AND 6.043003

LC50 = 0.09826883E-02
95 PERCENT CONFIDENCE LIMITS = 6.491478E-02 AND .1486359

LC10 = 4.664693E-02
95 PERCENT CONFIDENCE LIMITS = 1.699117E-02 AND .0693449

Grasses [Vegetative Vigor - 3 UK Rating]

r.petrie spike 10-02-89

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
1.28	100	100	100	0
.64	100	98	98	0
.32	100	97	97	0
.16	100	80	80	0
.08	100	20	20	0
.04	100	0	0	0

WHEAT

THE BINOMIAL TEST SHOWS THAT .08 AND .16 CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .1131371

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS
4	1.027634E-02		.1212923 .1096925 .1333495

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
6	.686671	14.47656	0

A PROBABILITY OF 0 MEANS THAT IT IS LESS THAN 0.001.

SINCE THE PROBABILITY IS LESS THAN 0.05, RESULTS CALCULATED USING THE PROBIT METHOD PROBABLY SHOULD NOT BE USED.

SLOPE = 4.375439
95 PERCENT CONFIDENCE LIMITS = .7497048 AND 8.001173

LC50 = .1196167
95 PERCENT CONFIDENCE LIMITS = 5.052327E-02 AND .2758819

LC10 = 6.131055E-02
95 PERCENT CONFIDENCE LIMITS = 1.941015E-03 AND .1007996

r.petrie spike 10-02-89

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
1.28	100	50	50	0
.64	100	22	22	0
.32	100	7	7	0
.16	100	7	7	0
.08	100	0	0	0
.04	100	0	0	0

CORN

THE BINOMIAL TEST SHOWS THAT 1.28 AND 1.28 CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS 1.28

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS
1	.2213008	1.28	1.068355 1.867476

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
4	4.721102E-02	1	.0964129

SLOPE = 1.985868
95 PERCENT CONFIDENCE LIMITS = 1.554376 AND 2.417359

LC50 = 1.394201
95 PERCENT CONFIDENCE LIMITS = 1.11567 AND 1.900314

LC10 = .3197469
95 PERCENT CONFIDENCE LIMITS = .2485265 AND .3877696

r.petrie spike 10-02-89

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
1.28	100	47	47	0
.64	100	0	0	0
.32	100	3	3	0
.16	100	0	0	0
.08	100	0	0	0
.04	100	0	0	0

SORGHUM

THE BINOMIAL TEST SHOWS THAT 0 AND +INFINITY CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS 1.28

THE MOVING AVERAGE METHOD CANNOT BE USED WITH THIS DATA SET BECAUSE NO SPAN WHICH PRODUCES MOVING AVERAGE ANGLES THAT BRACKET 45 DEGREES ALSO USES TWO PERCENT DEAD BETWEEN 0 AND 100 PERCENT.

RESULTS CALCULATED USING THE PROBIT METHOD
ITERATIONS G H GOODNESS OF FIT PROBABILITY
 8 1.140794 6.730728 0
A PROBABILITY OF 0 MEANS THAT IT IS LESS THAN 0.001.

SINCE THE PROBABILITY IS LESS THAN 0.05, RESULTS CALCULATED USING THE PROBIT METHOD PROBABLY SHOULD NOT BE USED.

SLOPE = 4.094938
95 PERCENT CONFIDENCE LIMITS = -.2787819 AND 8.468659

LC50 = 1.430447
95 PERCENT CONFIDENCE LIMITS = .943158 AND +INFINITY

LC10 = .7003783
95 PERCENT CONFIDENCE LIMITS = 0 AND 1.07002

r.petrie spike 10-02-89

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
1.28	100	53	53	0
.64	100	27	27	0
.32	100	13	13	0
.16	100	10	10	0
.08	100	0	0	0
.04	100	0	0	0

RICE

THE BINOMIAL TEST SHOWS THAT .64 AND 1.28 CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS 1.184666

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS
1	.2697646	1.184666	.9843708 1.73942

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
3	4.053946E-02	1	.1323383

SLOPE = 1.832249
95 PERCENT CONFIDENCE LIMITS = 1.463337 AND 2.201162

LC50 = 1.2235
95 PERCENT CONFIDENCE LIMITS = .9827874 AND 1.640177

LC10 = .2480086
95 PERCENT CONFIDENCE LIMITS = .1904291 AND .3039269

Broodleaps *Ave. Plant Height % of control*

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
.64	100	90	90	0
.32	100	73	73	0
.16	100	55	55	0
.08	100	31	31	0
.04	100	18	18	0
.02	100	8	8	0

GADISH

BECAUSE THE NUMBER OF ORGANISMS USED WAS SO LARGE, THE 95 PERCENT CONFIDENCE INTERVALS CALCULATED FROM THE BINOMIAL PROBABILITY ARE UNRELIABLE. USE THE INTERVALS CALCULATED BY THE OTHER TESTS.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .1388526

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS		
5	2.124986E-02		.1375175	.1181618	.1614057

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
2	2.055717E-02	1	.90889

SLOPE = 1.771635[°]
 95 PERCENT CONFIDENCE LIMITS = 1.517623 AND 2.025648

LC50 = .1367305
 95 PERCENT CONFIDENCE LIMITS = .1176552 AND .1595292

LC10 = 2.624302E-02
 95 PERCENT CONFIDENCE LIMITS = 1.931892E-02 AND 3.339436E-02

 r.petrie spike plant 10-02-89

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
.64	100	90	90	0
.32	100	73	73	0
.16	100	55	55	0
.08	100	31	31	0
.04	100	18	18	0
.02	100	8	8	0

BECAUSE THE NUMBER OF ORGANISMS USED WAS SO LARGE, THE 95 PERCENT CONFIDENCE INTERVALS CALCULATED FROM THE BINOMIAL PROBABILITY ARE UNRELIABLE. USE THE INTERVALS CALCULATED BY THE OTHER TESTS.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .1388526

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS		
5	2.124986E-02		.1375175	.1181618	.1614057

RESULTS CALCULATED USING THE PROBIT METHOD
ITERATIONS G H GOODNESS OF FIT PROBABILITY
 2 2.055717E-02 1 .90889

RADISH

SLOPE = 1.771635
95 PERCENT CONFIDENCE LIMITS = 1.517623 AND 2.025648

LC50 = .1367305
95 PERCENT CONFIDENCE LIMITS = .1176552 AND .1595292

LC10 = 2.624302E-02
95 PERCENT CONFIDENCE LIMITS = 1.931892E-02 AND 3.339436E-02

r.petrie spike plant 10-02-89

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
.64	100	48	48	0
.32	100	21	21	0
.16	100	21	21	0
.08	100	3	3	0
.04	100	6	6	0
.02	100	3	3	0

COTTON

THE BINOMIAL TEST SHOWS THAT 0 AND +INFINITY CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .3200001 ✓

THE MOVING AVERAGE METHOD CANNOT BE USED WITH THIS DATA SET BECAUSE NO SPAN WHICH PRODUCES MOVING AVERAGE ANGLES THAT BRACKET 45 DEGREES ALSO USES TWO PERCENT DEAD BETWEEN 0 AND 100 PERCENT.

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
3	.2980507	2.802145	2.431727E-02

SINCE THE PROBABILITY IS LESS THAN 0.05, RESULTS CALCULATED USING THE PROBIT METHOD PROBABLY SHOULD NOT BE USED.

SLOPE = 1.277203
95 PERCENT CONFIDENCE LIMITS = .5799266 AND 1.97448

LC50 = .9049733
95 PERCENT CONFIDENCE LIMITS = .4477303 AND 6.510224

LC10 = 9.168019E-02
95 PERCENT CONFIDENCE LIMITS = 2.642825E-02 AND .1619587

r.petrie spike plant 10-02-89

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
.64	100	100	100	0
.32	100	50	50	0
.16	100	29	29	0
.08	100	11	11	0
.04	100	23	23	0
.02	100	11	11	0

CUCUMBER

THE BINOMIAL TEST SHOWS THAT .32 AND .32 CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .3200001

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS
4	1.845579E-02	.2142985	.1888183 .2459044

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
4	.8360436	17.40537	0

A PROBABILITY OF 0 MEANS THAT IT IS LESS THAN 0.001.

SINCE THE PROBABILITY IS LESS THAN 0.05, RESULTS CALCULATED USING THE PROBIT METHOD PROBABLY SHOULD NOT BE USED.

SLOPE = 1.62259
95 PERCENT CONFIDENCE LIMITS = .138968 AND 3.106212

LC50 = .2023788
95 PERCENT CONFIDENCE LIMITS = 5.375472E-02 AND 22.01373

LC10 = 3.337841E-02
95 PERCENT CONFIDENCE LIMITS = 3.546945E-09 AND 9.453717E-02

r.petrie spike plant 10-02-89

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
.64	100	53	53	0
.32	100	17	17	0
.16	100	8	8	0
.08	100	5	5	0
.04	100	7	7	0
.02	100	4	4	0

SUNFLOWER

THE BINOMIAL TEST SHOWS THAT .32 AND .64 CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .6067235

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS
1	.1283843	✓.6067236	.5294108 .7580496

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
4	.6869808	6.005272	0

A PROBABILITY OF 0 MEANS THAT IT IS LESS THAN 0.001.

SINCE THE PROBABILITY IS LESS THAN 0.05, RESULTS CALCULATED USING THE PROBIT METHOD PROBABLY SHOULD NOT BE USED.

SLOPE = 1.262267
95 PERCENT CONFIDENCE LIMITS = .2160459 AND 2.308489

LC50 = 1.028566
95 PERCENT CONFIDENCE LIMITS = .3850499 AND 3091.87

LC10 = .1014159
95 PERCENT CONFIDENCE LIMITS = 1.879446E-03 AND .2361478

r.petrie spike plant 10-02-89

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
.64	100	21	21	0
.32	100	12	12	0
.16	100	0	0	0
.08	100	0	0	0
.04	100	1	1	0
.02	100	0	0	0

SOYBEAN

THE BINOMIAL TEST SHOWS THAT 0 AND +INFINITY CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .64

THE MOVING AVERAGE METHOD CANNOT BE USED WITH THIS DATA SET BECAUSE NO SPAN WHICH PRODUCES MOVING AVERAGE ANGLES THAT BRACKET 45 DEGREES ALSO USES TWO PERCENT DEAD BETWEEN 0 AND 100 PERCENT.

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
5	.754862	3.052376	1.585901E-02

SINCE THE PROBABILITY IS LESS THAN 0.05, RESULTS CALCULATED USING THE PROBIT METHOD PROBABLY SHOULD NOT BE USED.

SLOPE = 1.899558
95 PERCENT CONFIDENCE LIMITS = .2491689 AND 3.549948

LC50 = 1.65328
95 PERCENT CONFIDENCE LIMITS = .726144 AND 38230.16

LC10 = .3546256
95 PERCENT CONFIDENCE LIMITS = 9.646706E-02 AND 1.010078

r.petrie spike 10-02-89

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
.64	100	100	100	0
.32	100	94	94	0
.16	100	44	44	0
.08	100	38	38	0
.04	100	11	11	0
.02	100	19	19	0

CABBAGE

THE BINOMIAL TEST SHOWS THAT .16 AND .32 CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .1716223

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS
5	.016817	.1052716 ✓	9.174381E-02 .1204967

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
5	.5347745	14.81234	0

A PROBABILITY OF 0 MEANS THAT IT IS LESS THAN 0.001.

SINCE THE PROBABILITY IS LESS THAN 0.05, RESULTS CALCULATED USING THE PROBIT METHOD PROBABLY SHOULD NOT BE USED.

SLOPE = 2.063299
95 PERCENT CONFIDENCE LIMITS = .5544438 AND 3.572153

LC50 = .1040389
95 PERCENT CONFIDENCE LIMITS = 3.432185E-02 AND .2936111

LC10 = 2.521602E-02
95 PERCENT CONFIDENCE LIMITS = 3.852234E-04 AND 5.909078E-02

Grasses

Ave. Plant Ht. [in feet]

r.petrie spike plant 10-02-89

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
1.28	100	100	100	0
.64	100	93	93	0
.32	100	81	81	0
.16	100	64	64	0
.08	100	16	16	0
.04	100	7	7	0

WHEAT

THE BINOMIAL TEST SHOWS THAT .08 AND .16 CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .1321847

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS
4	1.840274E-02		.1493154 .1314797 .1691319

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
3	8.931559E-02	2.499817	4.044026E-02

SINCE THE PROBABILITY IS LESS THAN 0.05, RESULTS CALCULATED USING THE PROBIT METHOD PROBABLY SHOULD NOT BE USED.

SLOPE = 2.714101
95 PERCENT CONFIDENCE LIMITS = 1.902973 AND 3.52523

LC50 = .1482797
95 PERCENT CONFIDENCE LIMITS = .1126604 AND .1925899

LC10 = 5.048418E-02
95 PERCENT CONFIDENCE LIMITS = 2.845413E-02 AND 7.155208E-02

r.petrie spike 10-02-89

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
1.28	100	48	48	0
.64	100	28	28	0
.32	100	12	12	0
.16	100	5	5	0
.08	100	0	0	0
.04	100	0	0	0

CORN

THE BINOMIAL TEST SHOWS THAT 0 AND +INFINITY CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .4525484

THE MOVING AVERAGE METHOD CANNOT BE USED WITH THIS DATA SET BECAUSE NO SPAN WHICH PRODUCES MOVING AVERAGE ANGLES THAT BRACKET 45 DEGREES ALSO USES TWO PERCENT DEAD BETWEEN 0 AND 100 PERCENT.

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
4	4.392844E-02	1	.80197

SLOPE = 1.963932
95 PERCENT CONFIDENCE LIMITS = ~~1.552309~~ AND 2.375555

LC50 = 1.30229
95 PERCENT CONFIDENCE LIMITS = 1.05002 AND 1.745719

LC10 = .2937959
95 PERCENT CONFIDENCE LIMITS = .228035 AND .3567981

r.petrie spike 10-02-89

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
1.28	100	32	32	0
.64	100	23	23	0
.32	100	6	6	0
.16	100	0	0	0
.08	100	0	0	0
.04	100	0	0	0

SORGHUM

THE BINOMIAL TEST SHOWS THAT 0 AND +INFINITY CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .4525484

THE MOVING AVERAGE METHOD CANNOT BE USED WITH THIS DATA SET BECAUSE NO SPAN WHICH PRODUCES MOVING AVERAGE ANGLES THAT BRACKET 45 DEGREES ALSO USES TWO PERCENT DEAD BETWEEN 0 AND 100 PERCENT.

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
5	6.716398E-02	1	.2433191

SLOPE =

2.0998

95 PERCENT CONFIDENCE LIMITS = 1.555615 AND 2.643984

LC50 = 1.841647

95 PERCENT CONFIDENCE LIMITS = 1.416373 AND 2.76433

LC10 = .4574956

95 PERCENT CONFIDENCE LIMITS = .3578716 AND .5524683

r.petrie spike 10-02-89

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
1.28	100	32	32	0
.64	100	25	25	0
.32	100	10	10	0
.16	100	0	0	0
.08	100	0	0	0
.04	100	0	0	0

RICE

THE BINOMIAL TEST SHOWS THAT 0 AND +INFINITY CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .4525484

THE MOVING AVERAGE METHOD CANNOT BE USED WITH THIS DATA SET BECAUSE NO SPAN WHICH PRODUCES MOVING AVERAGE ANGLES THAT BRACKET 45 DEGREES ALSO USES TWO PERCENT DEAD BETWEEN 0 AND 100 PERCENT.

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
4	6.163468E-02	1	.101172

SLOPE =

1.912733

95 PERCENT CONFIDENCE LIMITS = 1.437871 AND 2.387594

LC50 = 1.849838

95 PERCENT CONFIDENCE LIMITS = 1.40199 AND 2.817003

LC10 = .4010164

95 PERCENT CONFIDENCE LIMITS = .3103778 AND .4891874

R. Petrie
R. Petrie

R. Petrie Spike 10-03-89

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
.64	100	98	98	0
.32	100	92	92	0
.16	100	76	76	0
.08	100	37	37	0
.04	100	24	24	0
.02	100	9	9	0

RADISH

BECAUSE THE NUMBER OF ORGANISMS USED WAS SO LARGE, THE 95 PERCENT CONFIDENCE INTERVALS CALCULATED FROM THE BINOMIAL PROBABILITY ARE UNRELIABLE. USE THE INTERVALS CALCULATED BY THE OTHER TESTS.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .1002102

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
5	.01	.573863E-02	.08	.588146E-02
7.462475E-02		.09	.796879E-02	

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
3	1.742878E-02	1	.2473309

SLOPE = 2.416563
95 PERCENT CONFIDENCE LIMITS = 2.010735 AND 2.622391

LC50 = .08.65313E-02
95 PERCENT CONFIDENCE LIMITS = 7.616115E-02 AND 9.805717E-02

LC10 = 2.4487E-02
95 PERCENT CONFIDENCE LIMITS = 1.920538E-02 AND 2.977754E-02

xxx xxx bird

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
50	20	10	50	58.80985
40	20	9	45	41.19014

THE BINOMIAL TEST SHOWS THAT 0 AND +INFINITY CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS 50

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS
1	41.101	0	+INFINITY

95 PERCENT CONFIDENCE LIMITS = 1.920538E-02 AND 2.977754E-02

R.Petrie Spike plnt 10-03-89

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
.64	100	52	52	0
.32	100	2	2	0
.16	100	15	15	0
.08	100	0	0	0
.04	100	12	12	0
.02	100	15	15	0

COTTON

BECAUSE THE NUMBER OF ORGANISMS USED WAS SO LARGE, THE 95 PERCENT CONFIDENCE INTERVALS CALCULATED FROM THE BINOMIAL PROBABILITY ARE UNRELIABLE. USE THE INTERVALS CALCULATED BY THE OTHER TESTS.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .6265823

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS
1	4.551525E-02	.6265823	.5729701

.706808

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
5	6.006559	19.81757	0

A PROBABILITY OF 0 MEANS THAT IT IS LESS THAN 0.001.

SINCE THE PROBABILITY IS LESS THAN 0.05, RESULTS CALCULATED USING THE PROBIT METHOD PROBABLY SHOULD NOT BE USED.

SLOPE = .6420625
95 PERCENT CONFIDENCE LIMITS = -.9315222 AND 2.215647

LC50 = 4.815645
95 PERCENT CONFIDENCE LIMITS = .239193 AND +INFINITY

LC10 = 5.065867E-02
95 PERCENT CONFIDENCE LIMITS = 0 AND +INFINITY

Ave Fresh Wt

R.Petrie Spike 10-03-89

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
.64	100	100	100	0
.32	100	83	83	0
.16	100	46	46	0
.08	100	8	8	0
.04	100	21	21	0
.02	100	15	15	0

CUCUMBER

THE BINOMIAL TEST SHOWS THAT .16 AND .32 CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .1715052 ✓

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS
5	1.527783E-02	.1366144	.1201135

.1562941

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
5	.6216281	16.68633	0

A PROBABILITY OF 0 MEANS THAT IT IS LESS THAN 0.001.

SINCE THE PROBABILITY IS LESS THAN 0.05, RESULTS CALCULATED USING THE PROBIT METHOD PROBABLY SHOULD NOT BE USED.

SLOPE = 1.985827
95 PERCENT CONFIDENCE LIMITS = .4201339 AND 3.551521

LC50 = .1320802
95 PERCENT CONFIDENCE LIMITS = .0397481 AND .5390541

LC10 = 3.029047E-02
95 PERCENT CONFIDENCE LIMITS = 1.203451E-04 AND 7.414464E-02

A PROGRAM FOR PESTICIDE FATE SIMULATION

DAILY ACCUMULATED PESTICIDE RESIDUES---MULTP. APPL.

Chemical name -----
Initial concentration (ppm) -----
Half-life -----
A number of application -----

0
0
0

Ave. Fresh Wt.

R. Petrie Spike

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
.64	100	53	53	0
.32	100	13	13	0
.16	100	1	1	0
.08	100	2	2	0
.04	100	11	11	0
.02	100	2	2	0

SUNFLOWER

BECAUSE THE NUMBER OF ORGANISMS USED WAS SO LARGE, THE 95 PERCENT CONFIDENCE INTERVALS CALCULATED FROM THE BINOMIAL PROBABILITY ARE UNRELIABLE. USE THE INTERVALS CALCULATED BY THE OTHER TESTS.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .610783

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS
1	9.831889E-02	.610783	.5405654

.7367571

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H
6	1.82921	14.72282

A PROBABILITY OF 0 MEANS THAT IT IS LESS THAN 0.001.

SINCE THE PROBABILITY IS LESS THAN 0.05, RESULTS CALCULATED USING THE PROBIT METHOD PROBABLY SHOULD NOT BE USED.

SLOPE = 1.296293
95 PERCENT CONFIDENCE LIMITS = -.4569214 AND 3.049507

LC50 = 1.188667
95 PERCENT CONFIDENCE LIMITS = .2964014 AND +INFINITY

LC10 = .1245499
95 PERCENT CONFIDENCE LIMITS = 0 AND +INFINITY

R. Petrie Spike

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
.64	100	9	9	0
.32	100	9	9	0
.16	100	0	0	0
.08	100	2	2	0
.04	100	1	1	0
.02	100	28	28	0

SOYBEAN

54

THE BINOMIAL TEST SHOWS THAT .64 AND +INFINITY CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT

CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL
ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .64

THE MOVING AVERAGE METHOD CANNOT BE USED WITH THIS DATA SET
BECAUSE NO SPAN WHICH PRODUCES MOVING AVERAGE ANGLES THAT
BRACKET 45 DEGREES ALSO USES TWO PERCENT DEAD BETWEEN 0 AND
100 PERCENT.

Soybean

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS G H

GOODNESS OF FIT PROBABILITY

5

12.06988

12.59272

0

A PROBABILITY OF 0 MEANS THAT IT IS LESS THAN 0.001.

SINCE THE PROBABILITY IS LESS THAN 0.05, RESULTS CALCULATED
USING THE PROBIT METHOD PROBABLY SHOULD NOT BE USED.

SLOPE = -.4249979

95 PERCENT CONFIDENCE LIMITS = -1.901514 AND 1.051518

LC50 = 4.969318E-05

95 PERCENT CONFIDENCE LIMITS = 0 AND 2.248688E-02

LC10 = 4.836675E-02

95 PERCENT CONFIDENCE LIMITS = 0 AND +INFINITY

R. Petrie Spike

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
.64	100	100	100	0
.32	100	100	100	0
.16	100	70	70	0
.08	100	67	67	0
.04	100	7	7	0
.02	100	35	35	0

CABBAGE

THE BINOMIAL TEST SHOWS THAT .04 AND .08 CAN BE
USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT
CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL
ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS 6.717787E-02

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN G LC50 95 PERCENT CONFIDENCE LIMITS

4

2.432728E-02

7.069475E-02

6.089524E-02

8.156674E-02

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS G H

GOODNESS OF FIT PROBABILITY

5

.8220303

20.22763

0

SS

SINCE THE PROBABILITY IS LESS THAN 0.05, RESULTS CALCULATED USING THE PROBIT METHOD PROBABLY SHOULD NOT BE USED.

SLOPE = 2.061782
95 PERCENT CONFIDENCE LIMITS = .1924489 AND 3.931116

LC50 = 0.06.085123E-02
95 PERCENT CONFIDENCE LIMITS = 1.826093E-03 AND .2240005

LC10 = 1.473321E-02
95 PERCENT CONFIDENCE LIMITS = 1.174714E-09 AND 4.165126E-02

R.Petrie Spike

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
1.28	100	100	100	0
.64	100	100	100	0
.32	100	91	91	0
.16	100	85	85	0
.08	100	35	35	0
.04	100	0	0	0

WHEAT

THE BINOMIAL TEST SHOWS THAT .08 AND .16 CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS 0.730718E-02

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS
4	8.831124E-03	.1147295	.1043234

.125428

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H
6	.2584306	5.652153

A PROBABILITY OF 0 MEANS THAT IT IS LESS THAN 0.001.

SINCE THE PROBABILITY IS LESS THAN 0.05, RESULTS CALCULATED USING THE PROBIT METHOD PROBABLY SHOULD NOT BE USED.

SLOPE = 3.942006
95 PERCENT CONFIDENCE LIMITS = 1.938045 AND 5.945967

LC50 = .1073071
95 PERCENT CONFIDENCE LIMITS = 7.386158E-02 AND .1533809

LC10 = 5.110427E-02
95 PERCENT CONFIDENCE LIMITS = 2.065931E-02 AND 7.416244E-02

R.Petrie Spike

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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
1.28	100	29	29	0
.64	100	20	20	0
.32	100	0	0	0
.16	100	0	0	0
.08	100	0	0	0
.04	100	0	0	0

CORN

THE BINOMIAL TEST SHOWS THAT 1.28 AND +INFINITY CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .4525484

THE MOVING AVERAGE METHOD CANNOT BE USED WITH THIS DATA SET BECAUSE NO SPAN WHICH PRODUCES MOVING AVERAGE ANGLES THAT BRACKET 45 DEGREES ALSO USES TWO PERCENT DEAD BETWEEN 0 AND 100 PERCENT.

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H
6	.4427318	2.60863

GOODNESS OF FIT PROBABILITY

.0337112

SINCE THE PROBABILITY IS LESS THAN 0.05, RESULTS CALCULATED USING THE PROBIT METHOD PROBABLY SHOULD NOT BE USED.

SLOPE = 2.563849
95 PERCENT CONFIDENCE LIMITS = .8579128 AND 4.269785

LC50 = 1.849948
95 PERCENT CONFIDENCE LIMITS = 1.178134 AND 10.82644

LC10 = .5913035
95 PERCENT CONFIDENCE LIMITS = .2466455 AND .8626431

R.Petrie Spike

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
1.28	100	38	38	0
.64	100	1	1	0
.32	100	0	0	0
.16	100	0	0	0
.08	100	0	0	0
.04	100	0	0	0

SORGHUM

THE BINOMIAL TEST SHOWS THAT 1.28 AND +INFINITY CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .4525484

THE MOVING AVERAGE METHOD CANNOT BE USED WITH THIS DATA SET

BRACKET 45 DEGREES ALSO USES TWO PERCENT DEAD BETWEEN 0 AND 100 PERCENT.

RESULTS CALCULATED USING THE PROBIT METHOD
 ITERATIONS G H
 GOODNESS OF FIT PROBABILITY
 8 .1453268 1
 .9999999

Sorghum

SLOPE = 6.716243
 95 PERCENT CONFIDENCE LIMITS = 4.155893 AND 9.276592

LC50 = 1.4213
 95 PERCENT CONFIDENCE LIMITS = 1.301667 AND 1.648354

LC10 = .9195847
 95 PERCENT CONFIDENCE LIMITS = .7615033 AND 1.017149

R. Petrie Spike

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
1.28	100	44	44	0
.64	100	31	31	0
.32	100	0	0	0
.16	100	0	0	0
.08	100	0	0	0
.04	100	0	0	0

RICE

THE BINOMIAL TEST SHOWS THAT 1.28 AND +INFINITY CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .4525484

THE MOVING AVERAGE METHOD CANNOT BE USED WITH THIS DATA SET BECAUSE NO SPAN WHICH PRODUCES MOVING AVERAGE ANGLES THAT BRACKET 45 DEGREES ALSO USES TWO PERCENT DEAD BETWEEN 0 AND 100 PERCENT.

RESULTS CALCULATED USING THE PROBIT METHOD
 ITERATIONS G H
 GOODNESS OF FIT PROBABILITY
 6 .4188484 3.864634
 3.838956E-03

SINCE THE PROBABILITY IS LESS THAN 0.05, RESULTS CALCULATED USING THE PROBIT METHOD PROBABLY SHOULD NOT BE USED.

SLOPE = 2.98315
 95 PERCENT CONFIDENCE LIMITS = 1.0525 AND 4.9138

LC50 = 1.256369
 95 PERCENT CONFIDENCE LIMITS = .8673319 AND 3.643199

LC10 = .4714034
 95 PERCENT CONFIDENCE LIMITS = .1582541 AND .6842376

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